

REMARKS

Claims 1-32 are in the application, of which Claims 1, 16, 25 and 31 are the independent claims. Claims 1, 2, 10, 11, 12, 13, 16, 17, 22 and 31 have been amended herein. Claims 9, 14, 15, 20 and 21 have been canceled herein without prejudice. New Claim 32 has been added. Reconsideration and further examination are respectfully requested.

No new matter is believed to have been introduced to the application by this amendment. For example, the specification and some of the claims have been amended to correct typographical errors. The subject matter of Claim 9 has been added to Claim 1. The subject matter of Claims 20 and 21 has been added to Claim 16.

Initially, Applicants thank the Examiner for the thoughtful courtesies extended to Applicants' representative during the telephonic interview held on August 8, 2006 to discuss the rejections in the Office Action. The discussions presented during the interview are described in the relevant paragraphs below.

In the Office Action, Claims 1-24 and 31 were rejected under 35 U.S.C. § 112, ¶2, for allegedly being indefinite. Without conceding the correctness of the rejection, in the interest of expediting prosecution of the application, Claims 1, 12, 13, 16 and 31 have been amended, as discussed during the interview, to overcome the 112 rejection.

As discussed during the interview, the specification at paragraphs [0032] and [0033] provides an exemplary tensile stress range from 0.01 MPa to 1 MPa and an exemplary compressive stress range from 1 MPa to 100 MPa. A tensile stress range from 0.01 MPa to 1 MPa recited in original Claim 9 has been added to Claim 1 herein. Amended Claims 1, 16 and 31 now refer to a stress as overall tensile or overall compressive. In addition, as discussed

during the interview, in Claims 12 and 13, the x and y ranges have been amended to start from a number greater than 0.

The Office Action states: “how is it possible for the silicon oxynitride layer to have possibly the same composition yet one layer have a tensile stress and the other a compressive stress?” As described in the specification (e.g., paragraph [0041]), a silicon oxynitride layer can be tensile or compressive depending on the processing parameters. Reconsideration and withdrawal of the § 112, ¶2 rejection is respectfully requested.

Figure 5 was objected to under 37 CFR 1.83(a) because the figure allegedly fails to show the absence of sign of cracking or delamination as described in the specification. Pursuant to the discussion during the interview, Applicants have prepared and submit herewith a replacement formal drawing for Figure 5. The replacement drawing is believed to meet all formal drawing requirements and show the absence of sign of cracking or delamination. While Figure 6 shows lines of cracking and delamination, such lines of cracking and delamination are absent in Figure 5. Withdrawal of the objection to the drawing is respectfully requested.

The Office Action states that should Claim 1 be found allowable, Claim 17 would be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Applicants thank the Examiner for the clarification during the interview that while the Office Action refers to Claim 17, Claim 16 was intended. Applicants believe that the scope of original Claim 16 is different from the scope of Claim 1, and the scope of amended Claim 16 is also different from the scope of amended Claim 1. Withdrawal of the objection to Claim 16 is respectfully requested.

Claims 14 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,425,983 (Propst) or U.S. Patent No. 6,362,091 (Andideh); Claims 1-8, 12-16 and 20 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,461,899 (Kitakado); Claims 16-18 and 20 were rejected under 35 U.S.C. §102(a) as being anticipated by

U.S. Patent Application Publication No. 2003/0155632 (Goldstein); and Claims 1, 11, 14-20 and 31 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,587,263 (Iacovangelo) in view of Goldstein.

The present invention generally relates to thermal insulation technology. With reference to particular claim language, amended independent Claim 1 is directed to a device for providing environmental stability and mechanical integrity in space. The device includes: (i) a substrate; (ii) a first silicon oxynitride layer on the substrate, the first silicon oxynitride layer having an overall tensile stress in a range from 0.01 MPa to 1 MPa; and (iii) a second silicon oxynitride layer on the first silicon oxynitride layer, the second silicon oxynitride layer having an overall compressive stress.

Amended independent Claim 16 is directed to a device for providing environmental stability and mechanical integrity in space. The device includes: (i) a substrate and (ii) a silicon oxynitride coating layer on the substrate, the silicon oxynitride coating layer having a changing stress, the changing stress being overall compressive on a top surface of the silicon oxynitride coating layer and overall tensile on a bottom surface of the silicon oxynitride coating layer. The silicon oxynitride coating layer includes at least a first coating sub-layer and a second coating sub-layer. The second coating sub-layer is on the first coating sub-layer. The second coating sub-layer has the compressive stress, and the first coating sub-layer has the tensile stress. The first coating sub-layer has a first thickness ranging from 5 microns to 35 microns.

Amended independent Claim 31 is directed to an optical solar reflector for providing environmental stability and mechanical integrity in space. The reflector includes: (i) a substrate; (ii) a first silicon oxynitride layer on the substrate, the first silicon oxynitride layer having an overall tensile stress; and (iii) a second silicon oxynitride layer on the first silicon oxynitride layer, the second silicon oxynitride layer having an overall compressive stress.

Applicants note that in the Office Action, Claims 9-10 and 21-24 were not rejected based on any prior art. Accordingly, the subject matter of Claims 9-10 and 21-24 is understood to be allowable. The allowable subject matter of Claim 9 has been added into Claim 1, and the allowable subject matter of Claim 21 and intervening Claim 20 has been added into Claim 16 to place independent Claims 1 and 16 in condition for allowance.

To expedite the prosecution of the application, independent Claims 14 and 15 have been canceled herein without prejudice or disclaimer of the subject matter, and without conceding the correctness of their rejection.

As for independent Claim 31, it was rejected under 35 U.S.C. §103(a) over Iacovangelo in view of Goldstein. Applicants respectfully request withdrawal of the rejection for the following reasons: First, Iacovangelo and Goldstein are not analogous. While Iacovangelo relates to optical solar reflector in space applications (Iacovangelo, col. 1:10-11), Goldstein relates to integrated circuits formed on semiconductor wafer substrates (Goldstein, paragraph [0004]).

Second, while the Office Action states that in Goldstein, “[t]he stress coating is comprised of silicon oxynitride which varies from tensile stress to compressive stress at the surface of the coating,” Goldstein is not seen to disclose, suggest or teach a stress coating comprised of silicon oxynitride that varies from tensile stress to compressive stress.

Goldstein discloses three distinct embodiments, each embodiment having a compressive stress, a tensile stress, or no significant stress. In the first embodiment (Figure 2 of Goldstein), the ratio of N_y is approximately twenty percent N_y . In this first embodiment, the stress of the photonic device 100 is compressive, and the shape of the photonic device 100 is convex. (Goldstein, paragraphs [0024], last sentence; paragraph [0029])

In the second embodiment (Figure 3 of Goldstein), the ratio of N_y is approximately forty percent N_y . In this second embodiment, the photonic device 100 experiences no significant stress, and the shape of the photonic device 100 is substantially flat. (Goldstein, paragraphs [0024], third sentence; paragraph [0030])

In the third embodiment (Figure 4 of Goldstein), the ratio of N_y is approximately sixty percent N_y . In this third embodiment, the stress of the photonic device 100 is tensile, and the shape of the photonic device 100 is concave. (Goldstein, paragraphs [0024], second sentence; paragraph [0031])

Therefore, Goldstein discloses three distinct, separate photonic devices: a convex device having a compressive stress (Figure 2), a substantially flat device having no significant stress (Figure 3), and a concave device having a tensile stress (Figure 4). Goldstein does not disclose, suggest or teach one device including a first silicon oxynitride layer in tensile stress and a second silicon oxynitride layer in compressive stress. According to Goldstein, the stress in a particular device does not vary.

Third, Goldstein teaches away from the claimed invention. Goldstein desires to create a device that is convex, substantially flat or concave. The stress must be compressive to create a convex device, no significant stress to create a substantially flat device, or tensile to create a concave device. If the stress is varied within a device, one cannot create the desired convex device, substantially flat device, or concave device. Thus, Goldstein teaches away from varying the stress within a device.

Iacovangelo does not remedy the foregoing deficiencies of Goldstein. Iacovangelo discloses optical solar reflectors, but it is not seen to disclose, suggest or teach varying the stress within a device.


Accordingly, the applied references, either alone or in combination, are not seen to disclose, teach, or suggest the features of independent Claim 31, which is believed to be in condition for allowance.

All the other claims currently under consideration in the application are dependent from independent Claims 1, 16 or 31 discussed above and therefore are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants also respectfully request the attorney docket number be changed from "040092-028700US" to "070602-0411". Applicants' undersigned attorney may be contacted at the address and telephone number set forth below.

Respectfully submitted,
MCDERMOTT WILL & EMERY LLP

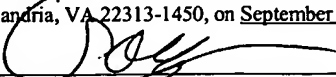

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Attachment (formal drawing of Figure 5)

Certificate of Mailing Under 37 CFR 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail under 37 CFR 1.8(a) in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 5, 2006.


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